

MODEL NO: TMA1-UP
MODEL NO: TMA1-UP-US

OPERATION MANUAL

Nintendo®

WARNING

This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accrdance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment, Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

WARNING

Use of non-Nintendo parts or modifications of your Nintendo game circuitry may adversely affect the safety of your game, and may cause injury to your players.

Contents

1. Location Setup

A. Game Inspection

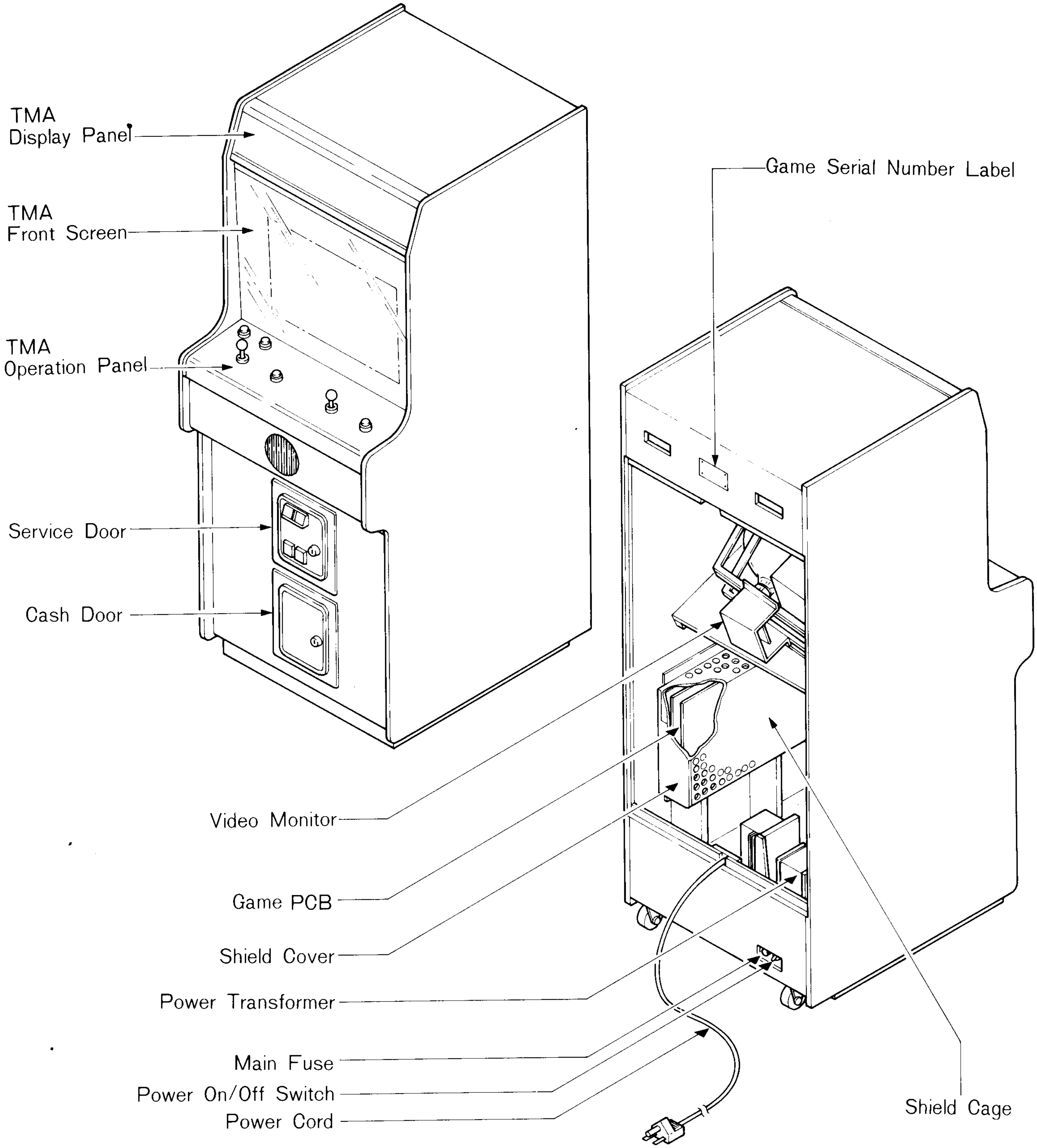


Fig. I Game Overview

WARNING

Check before plugging the game in !

The game "MARIO BROS." is shipped ready for operation, but a last visual check should be made to insure the final touch of quality control. Please check the following to help us insure that your new game was delivered to you in good condition.

(1) Check the exterior of the game for shipping damage, dents, chips, or broken parts.
(2) Remove the screws on the Rear Panel.
(3) Unlock and open the Rear Panel, as well as the Service Door inspect the interior of the game as follows:
 (a) Check that Plug-in connectors are firmly connected.
 (b) Check that Plug-in integrated circuits on the Game PCB are firmly connected in their sockets.
 (c) Check that all major subassemblies such as the Power Supply, Operation Panel, and Video Monitor are properly mounted.
 (d) Remove the tie-wrap that holds the coiled Power Cord on the inside cabinet wall. Check the cord for any cuts or dents in the insulation.

B. Game Installation

Fig. 2 Installation Requirements

Power	:	120 watts
Temperature	:	0 to 38 deg.C (32 to 100 deg.F)
Humidity	:	Not over 95% relative
Space required	:	70(W) × 85(D)cm (27 1/2 × 33 1/2 in.)
Height	:	172cm (67 1/2 in.)

(1) Voltage Selection

Before plugging in your game, make sure the Terminal Block of the Power Supply is correct for your location's line voltage.

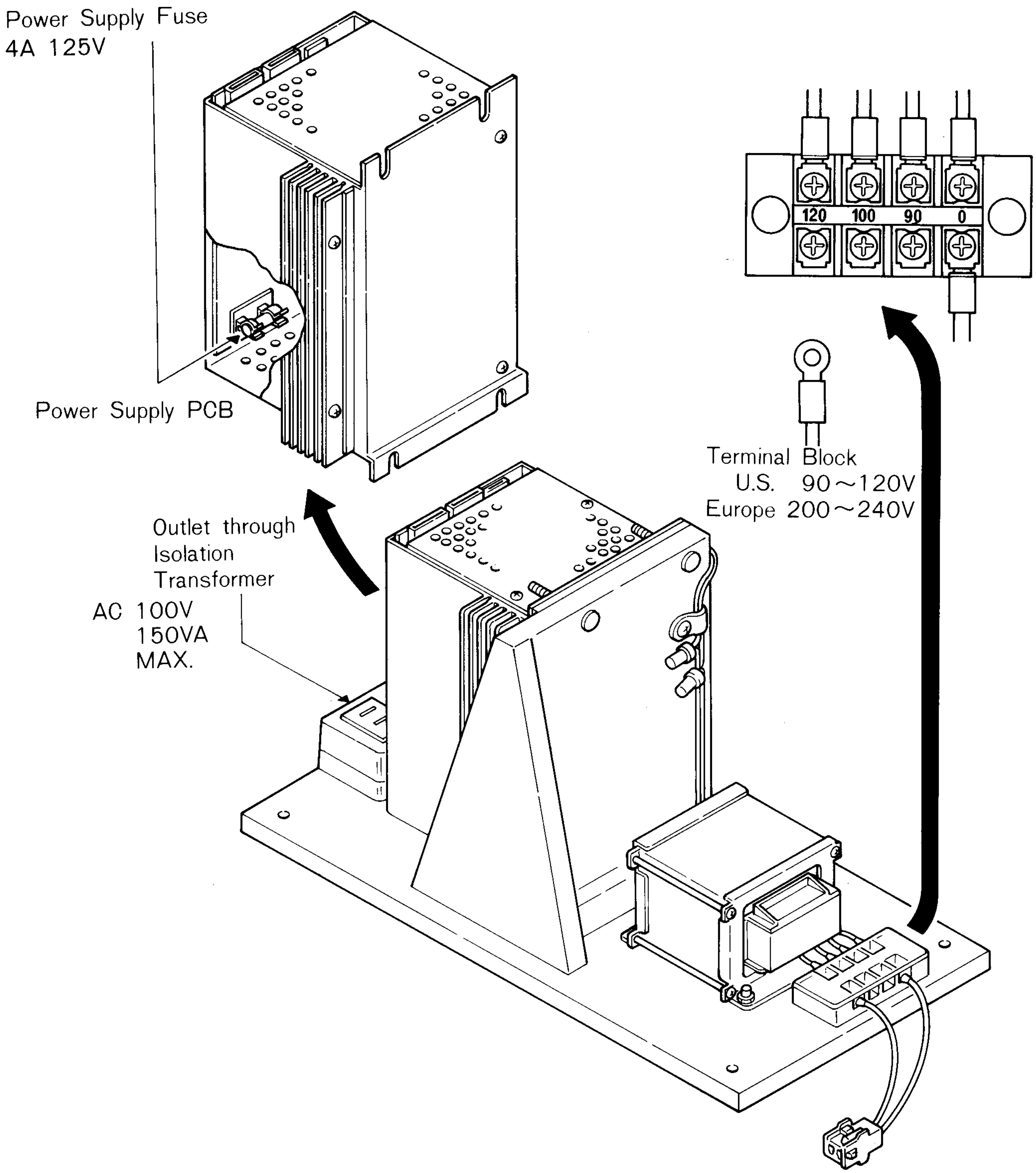


Fig. 3 Power Supply and Voltage Selection

(2) Power On/Off Switch

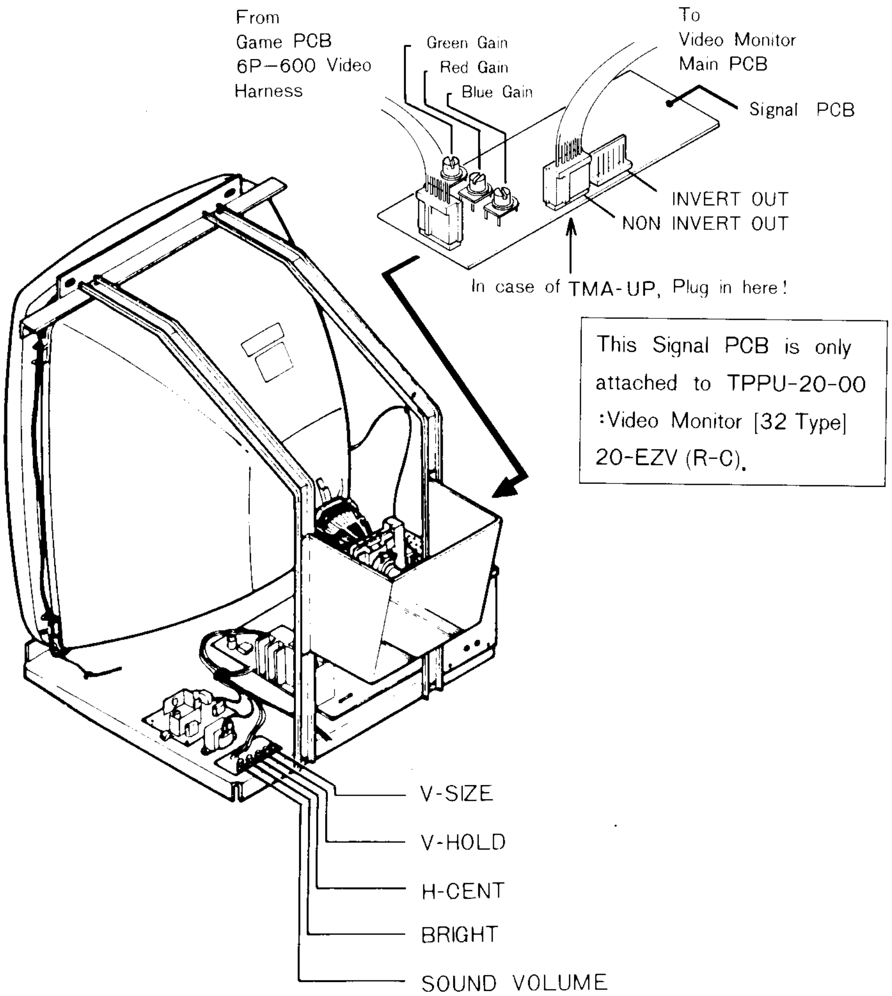
A Power On/Off Switch is located in the rear of the game at the bottom right side of the cabinet. See Fig. 1.

If the results of the preceding steps are satisfactory, you are ready to plug the game in, and set the Power On/Off Switch to the "On" position.

WARNING

This game MUST be grounded. Failure to do so may result in destruction of electronic components.

(3) Adjustment of Video Monitor



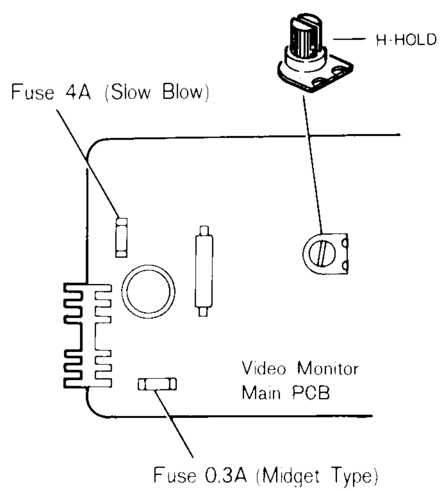


Fig. 4 Video Monitor

WARNING

Do not touch the inside of the Video Monitor.
It contains many parts supplied with high voltage.

2. Option Switch Settings

Option Toggle Switch is mounted on the Game PCB.

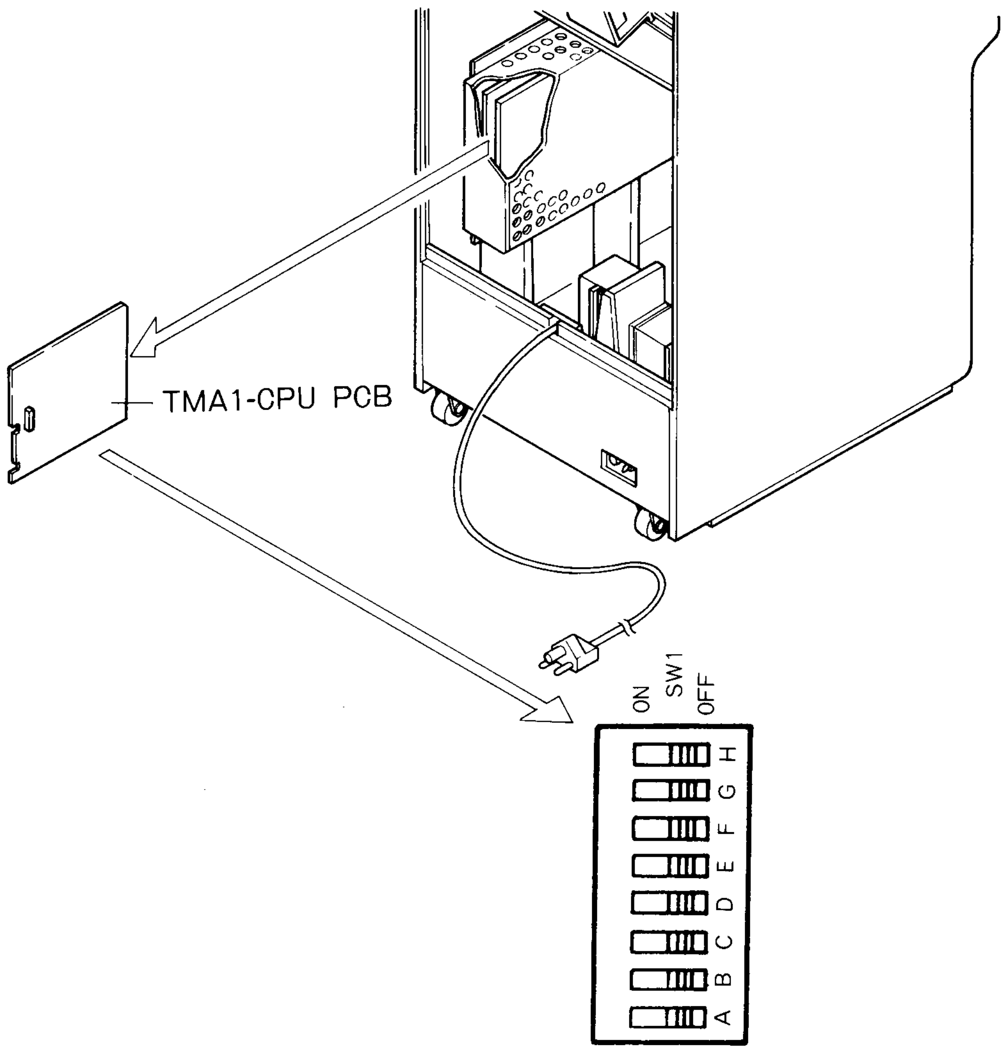


Fig. 5 Option Toggle Switch

A. Game Option Settings

		TOGGLE (SWI) SETTINGS							
		A	B	C	D	E	F	G	H
NUMBER OF MARIO/LUIGI PER GAME	3	OFF	OFF						
	4	ON	OFF						
	5	OFF	ON						
	6	ON	ON						
COIN/CREDIT	2/1			ON	OFF				
	1/1			OFF	OFF				
	1/2			OFF	ON				
	1/3			ON	ON				
EXTRA MARIO/LUIGI AT	20,000PTS.					OFF	OFF		
	30,000PTS.					ON	OFF		
	40,000PTS.					OFF	ON		
	NO EXTRA					ON	ON		
DIFFICULTY	EASY (1)							OFF	OFF
↓	(2)							OFF	ON
↓	(3)							ON	OFF
	HARD (4)							ON	ON

WARNING

All the Option Switch Settings MUST be done with Power Off.

3. Bookkeeping and Self-Test

(1) Entry

Press Service Switch and hold it down until Menu of Test Mode displays on the Video Monitor as follows.

Test Mode
1 BOOKKEEPING DISTRIBUTIONS
2 FREE PLAY
3 SELF-TEST & MONITOR ADJUSTMENT
4 RETURN TO GAME MODE

(2) Selection of Test

A flashing Shellcreeper points to the Test. Momentarily depressing Service Switch will step to next Test. When the shellcreeper is pointing to the desired Test, the details of the Test can be displayed by pressing the Service Switch and holding it down until the details appear on the Video Monitor.
(Except "RETURN TO GAME MODE")

(3) Back to Menu of Test Mode

You can recall Menu of Test Mode by holding down Service Switch until it re-appears.

(4) Back to Game Mode

When the shellcreeper is pointing to "RETURN TO GAME MODE", you will be able to return to Game Mode (Demonstration Game) by holding down Service Switch until it re-appears.

(WARNING)

TEST MODE will go back to Game Mode automatically if you do not push a switch or button or move the controller within a few minutes.

A. Bookkeeping Distributions:

1. Playtime distributions and number of plays per distribution range.
2. Score distributions and number of plays per distribution range.
3. Number of One (1) player games and playtimes per distribution range.
4. Number of Two (2) player games and playtimes per distribution range.

 * To clear all distributions, press either start button.

** Bookkeeping distribution system will not function when game is set in Free Play Mode.

B. Free-Play

Pressing either start button will set or clear "FREE PLAY" mode.

C. Self-Test & Monitor Adjustment

Pressing either start button will step to the next Test.

(C-1) RAM and ROM Test

The result of RAM and ROM Test will be displayed on the Video Monitor as follows.

Example

```
              RAM ROM TEST

    RAM               ROM    CHECKSUM
    7A      OK        7C           0F
    7B      OK        7D           :
                      7E           :
                      7F
     ↓                 ↓
  RAM location        ROM location
  on the PCB          on the PCB
```

(OK: Passed)

(NG: Failed)

(C-2) CRT Test

Color Bar and Marks on four Corners and center of screen are displayed on the Video Monitor one after another.

(C-3) SOUND TEST

You will hear the various sounds one after another.

(C-4) SWITCH TEST

The result of the switch condition will be displayed on the Video Monitor when you press each of the switches or move the controllers.

(2-Way Controllers, Jump Switches, 1-Player Switch, 2-Player Switch and Coin Switches.)

(C-5) End of Self-Test.

4. Maintenance and Repair

A. Fuse Replacement

This game contains 4 fuses. Replace fuses only with the same type as listed below.

Fig 7 Specification of Fuses

(1) Main fuse	U.S. :	5A 100V (90~120V)
	Europe :	2A 250V (200~240V)
		See Fig. 1
(2) Power Supply fuse		4A 100V
		See Fig. 3
(3) Video Monitor fuse		4A 100V
		0.3A 100V
		See Fig. 4

B. Cleaning

The exterior of the game, all metal parts and all plastic parts can be cleaned with a nonabrasive cleanser. You should be careful when cleaning the glass or plastic parts. A dry cloth may cause scratches which will result in a foggy appearance.

C. Operation Panel

(1) Operation Panel Removal

Before repairing or replacing any switches or 2 way Controllers on the Operation Panel, unplug the game. Open the Service Door, which are reach througn the opening, and unlock the Clamps, located at each end on the underside of the Operation Panel. See Fig. 10.

(2) Micro-switch Replacement

Whenever you replace any micro-switch on the Operation Panel, a switch gap adjustment is needed as shown in Fig. 8. Also, see Fig. 15 for layout of Control Panel Switches.

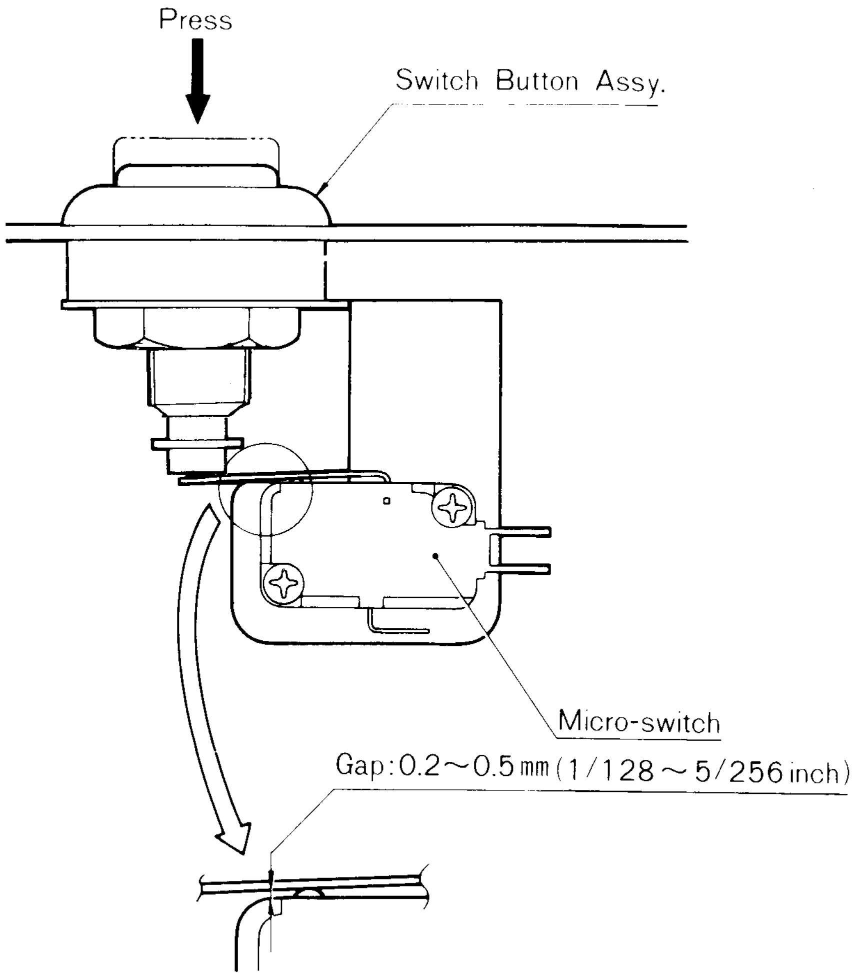


Fig. 8 Switch gap adjustment

(3) Lubrication for 2 way Controller

To maintain the 2 way Controller in good condition, lubricate the pillow balls and 2 way Guide Plate approx. every 3 months.
See Fig. 9.

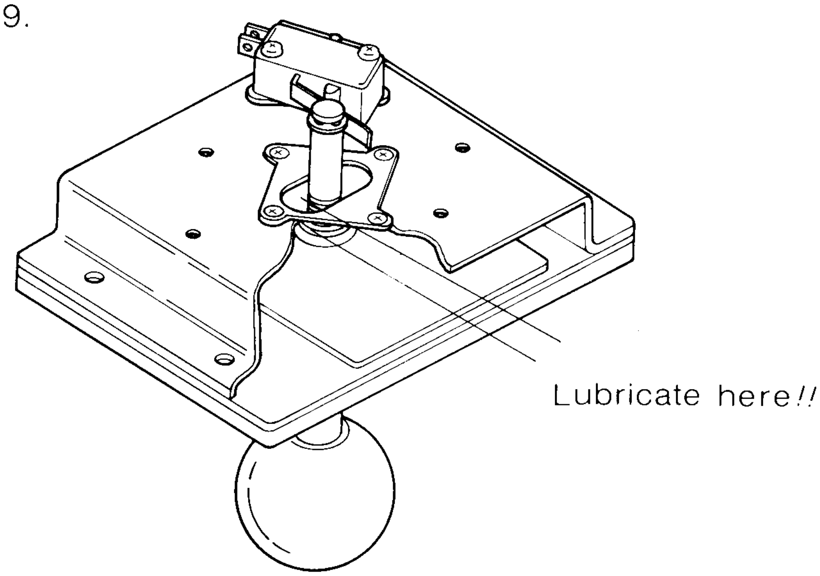


Fig. 9 Lubrication points

D. Front Screen & Video Monitor Removal

(1) Front Screen Removal
First remove the Operation Panel and then pull the Front Screen toward you.

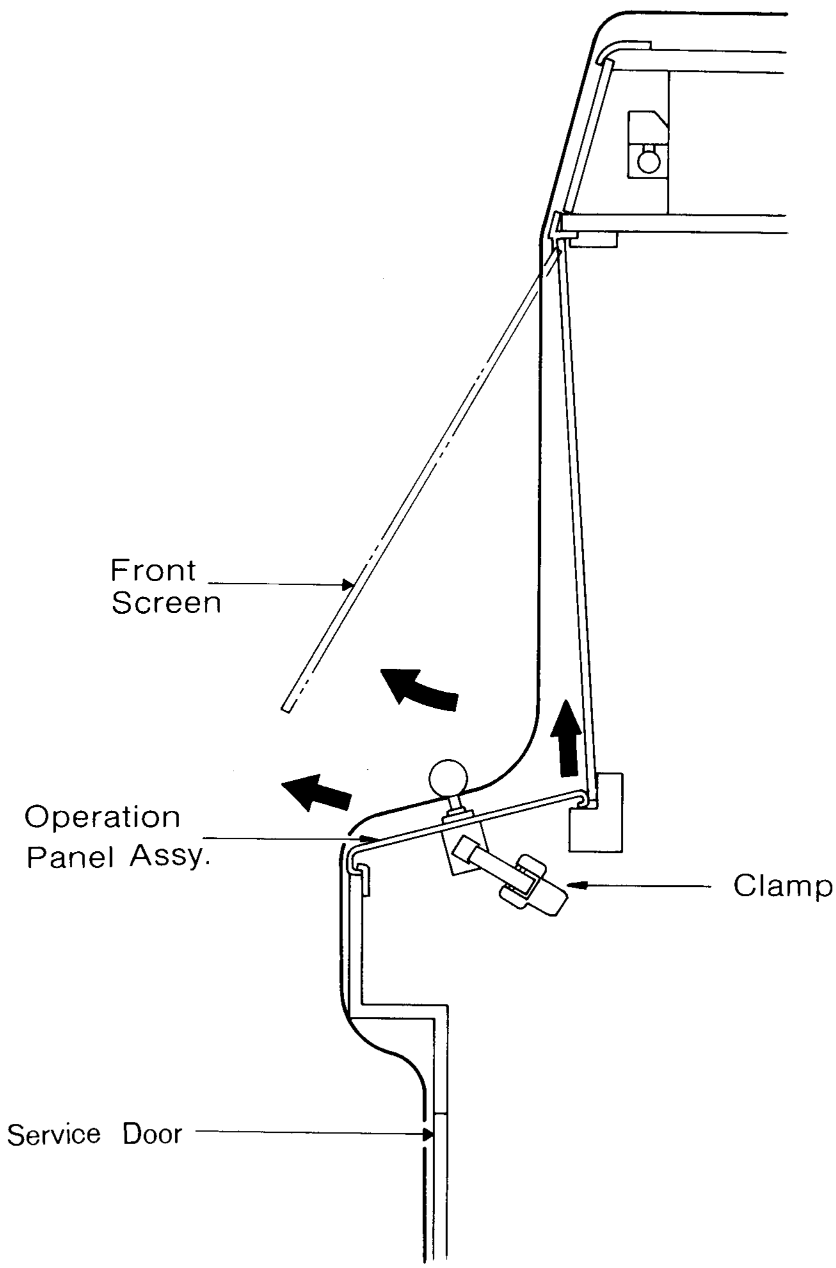


Fig. 10 Front Screen and Operation Panel Assy. removal

(2) Video Monitor Removal

If you need to remove the Video Monitor, follow the instructions listed below. But the following procedure should only be performed by an experienced service technician.

WARNING

It is recommended the game be left unplugged for at least one hour before removing the Video Monitor. This will probably discharge the CRT, but extreme caution is still necessary.

(a) Make sure game is unplugged !!
(b) Open the rear panel and remove the Front Screen.
(c) Unplug all the harnesses and cables from the Video Monitor.
(d) Standing at the front opening of the game, remove the four mounting bolts and flat washers. See Fig. 11.
(e) Carefully lift the Video Monitor and pull toward you.

WARNING

Use extreme caution and do not touch electrical parts of the yoke area with your hands or with any metal object in your hands.

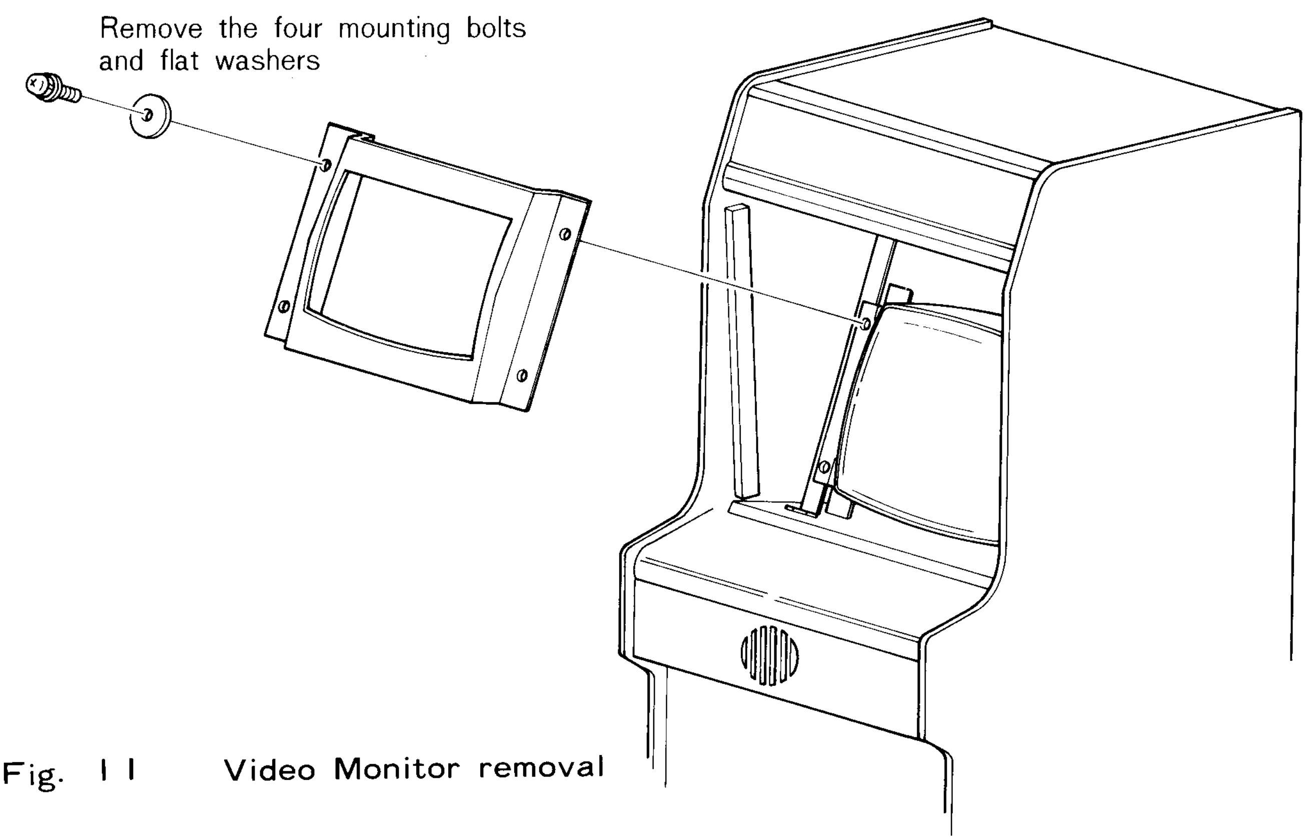


Fig. 11 Video Monitor removal

E. Game PCB Removal

(a) Make sure the game is unplugged !!
(b) Open the rear panel.
(c) Remove the 44-pin edge connector from the upper side of the 044-FCC PCB on the Shield Cover.
(d) Locate the 6 Phillips-head Screws on the Shield Cover. Remove and save these Screws.
(e) Remove the Game PCB from the Shield Cage by carefully sliding it straight out of the wooden PCB retainer.

WARNING

A reversed connector will damage your PCB !
If the connectors don't slip on easily, don't force them !

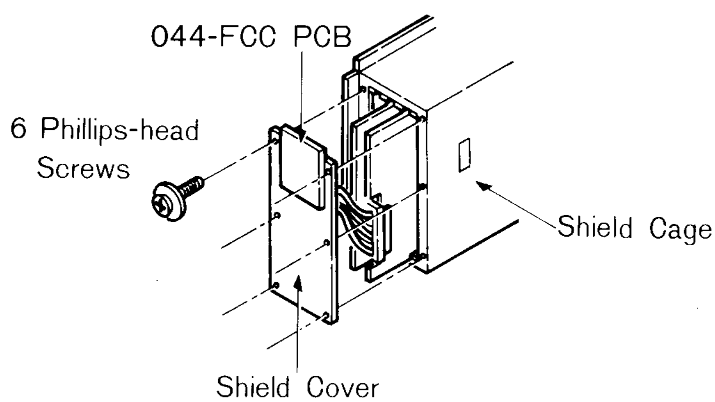


Fig. 12 Game PCB removal

5. Radio Frequency Interference (RFI)

In order to protect against the RFI radiated from this equipment, please comply with the following.

(a) Do not use non-Nintendo parts !
(b) Do not modify your game circuitry !
(c) Do not modify the wiring harness and connections !
(d) Connect this game only to a grounded 3-wire outlet.
(e) After servicing the Game PCB, shut the Shield Cover completely with the Screws. See Fig. 12.

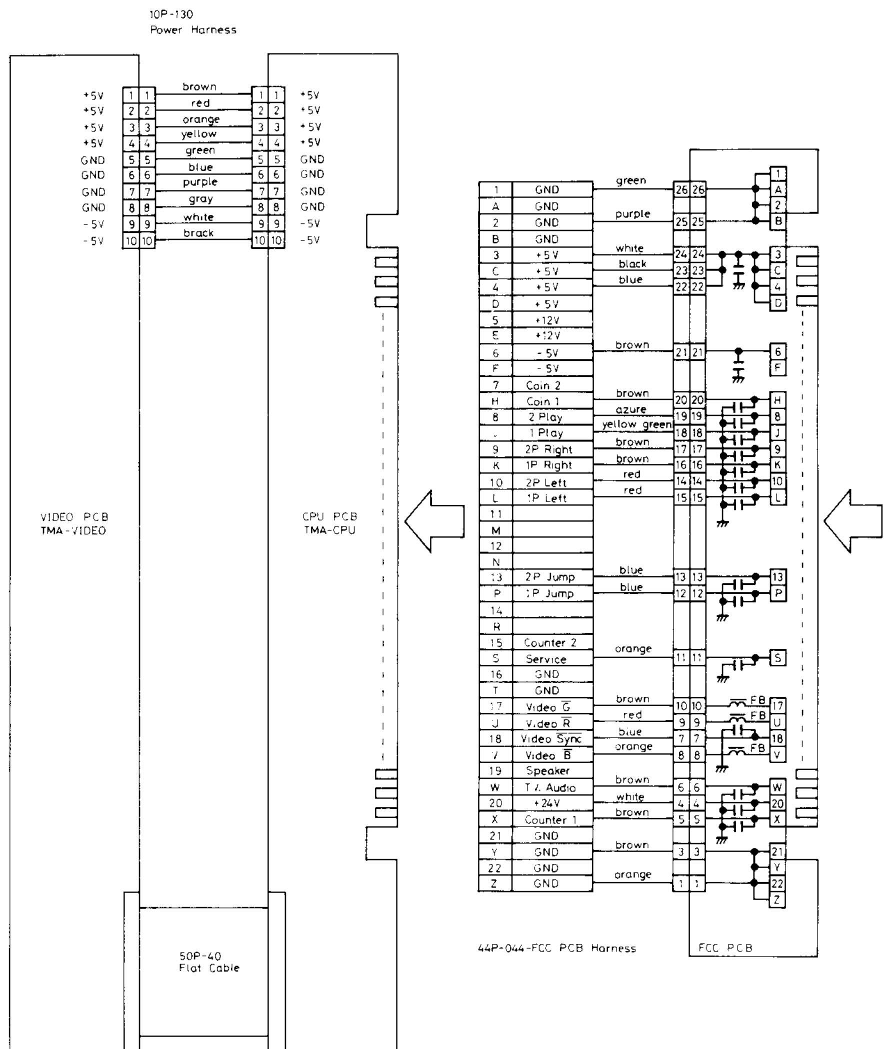
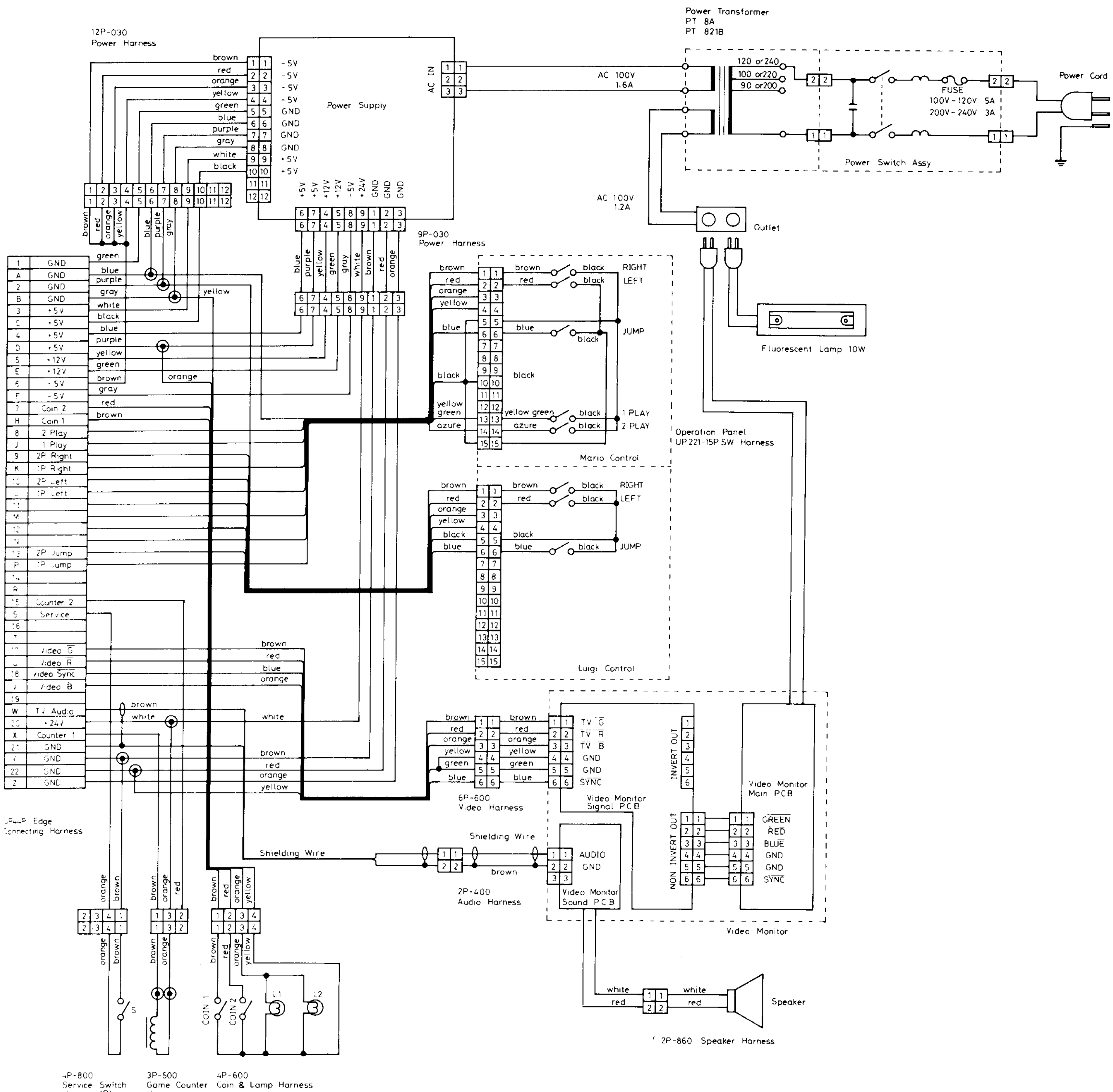


Fig 16
Wiring and Connection



Power Transformer
PT 8A
PT 821B
12P-030
Power Harness
Power Supply
AC IN
AC 100V
1.6A
120 or240
100 or220
90 or200
FUSE
100V~120V 5A
200V~240V 3A
Power Cord
Power Switch Assy
AC 100V
1.2A
Outlet
9P-030
Power Harness
Fluorescent Lamp 10W
RIGHT
LEFT
JUMP
1 PLAY
2 PLAY
Operation Panel
UP 221-15P SW Harness
Mario Control
Luigi Control
GND
+5V
+12V
-5V
Coin 2
Coin 1
2 Play
1 Play
2P Right
1P Right
2P Left
1P Left
2P Jump
1P Jump
Counter 2
Service
Video G
Video R
Video Sync
Video B
TV Audio
+24V
Counter 1
22P Edge
Connecting Harness
TV G
TV R
TV B
SYNC
INVERT OUT
NON INVERT OUT
Video Monitor
Main PCB
GREEN
RED
BLUE
6P-600
Video Harness
Video Monitor
Signal PCB
Shielding Wire
AUDIO
2P-400
Audio Harness
Video Monitor
Sound PCB
Video Monitor
Speaker
2P-860 Speaker Harness
COIN 1
COIN 2
L1
L2
4P-800
Service Switch
Harness (R)
3P-500
Game Counter
Harness
4P-600
Coin & Lamp Harness

7. Name and Location of each part and Parts List

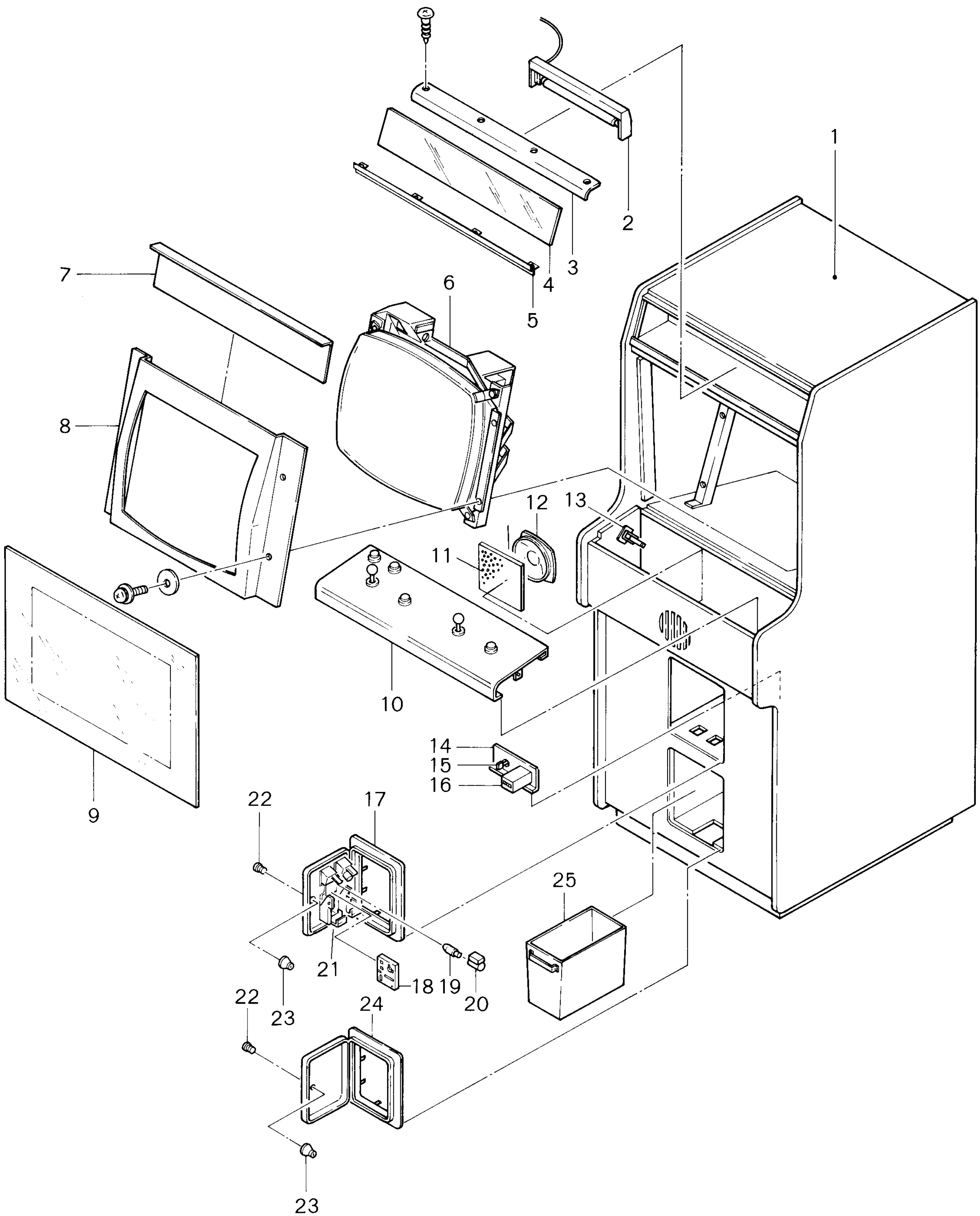


Fig. 13 Front View of Game Cabinet

PARTS LIST: TMA1-UP Game Cabinet Assembly

ITEM	PART No.	DESCRIPTION
1	TMAU-13-03	Body (Wooden Game Cabinet)
2	TKGU-01-29	Fluorescent Lamp Assy.
3	TMAU-11-26	Name Plate Retainer 668L
4	TMAU-12-12	TMA-US Display Panel (Name Plate)
5	TMAU-11-11	Center Trim 668L
6	TPPU-20-00	Video Monitor [32 Type] 20-EZV (R-C)
	or TKGU-20-00	Video Monitor [31 Type] 20-EZV (R-B)
7	TMAU-13-12	Blind Cardboard (337W)
8	TMAU-13-11	044 Black Cardboard Bezel
9	TMAU-12-13	TMA-US Front Screen
10	TMAU-12-11	TMA-US Operation Panel (Panel Only)
11	TKGU-01-49	Speaker Grill
12	TKGU-01-43	Speaker
13	TKGU-01-31	Operation Panel Clamp A (2 Required)
14	TMAU-11-20	CS Plate 120W
15	TKGU-01-33	Service Switch (with Button)
16	TKGU-01-11	Game Counter
17	TMAU-14-17	Service Door ADD-S2: Order By Currency
18	TMA-14-18	Coin Selector: Order By Currency
19	TMAU-34-17	Lamp BA-9S 6.3V 0.15A
20	TMAU-34-16	Lamp Socket BA-9S
21	TMAU-34-19	Micro-switch ADD D2MC-5F1
22	TMAU-14-12	Door Lock
23	TMAU-11-14	Cam B31R
24	TMAU-14-11	Cash Door ADD
25	TMAU-11-27	Cash Box ADD

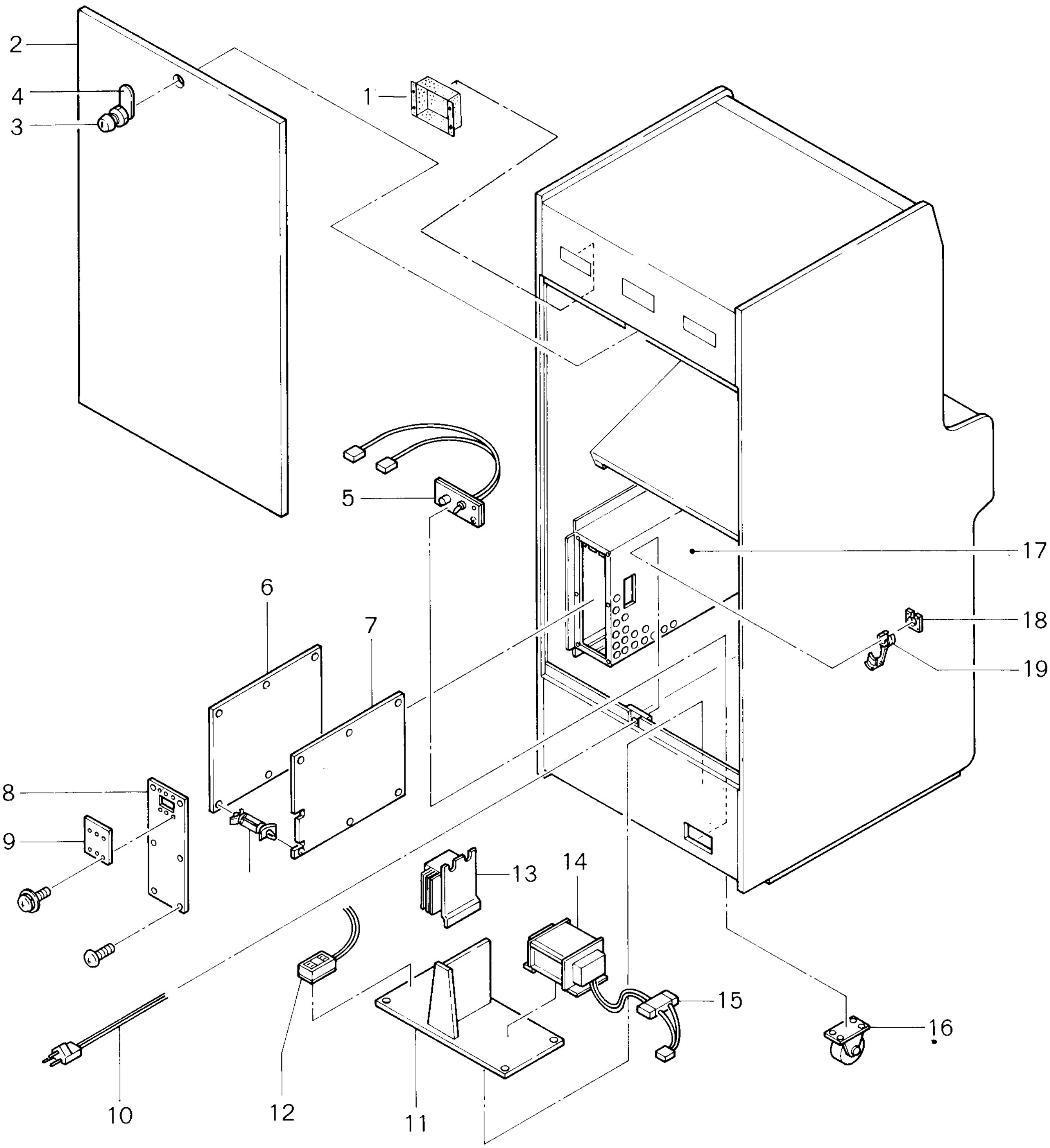


Fig. 14 Rear View of Game Cabinet

PARTS LIST: TMA1-UP Game Cabinet Assembly

ITEM	PART No.	DESCRIPTION
1	TKGU-01-61	Vent Grill
2	TMAU-13-15	Rear Panel
3	TMAU-14-14	Lock K6510
4	TMAU-11-15	Cam A
5	TMAU-30-12	Power On/Off Switch Assy. (For 90~120V)
	TMAU-30-13	Power On/Off Switch Assy. (For 200~240V)
6	TMAU-22-01	TMA1-VIDEO Complete PCB Assembly
7	TMAU-21-01	TMA1-CPU Complete PCB Assembly
8	TPPU-01-01-11	Shield Cover
9	TMAU-23-01	044-FCC Complete PCB Assembly
10	TKGU-01-08	Power Cord: Order By Voltage & Plug Type
11	TKGU-01-01-02	Transformer Base
12	TKGU-09-01-02	Outlet Through Isolation Transformer
13	DJRU-18-01	PP-7B-Complete Power Supply Assembly
14	DJRU-19-01-01	PT-821B Power Transformer (For 90~120V)
14	DJRU-09-01-01	PT-8A Power Transformer (For 200~240V)
15	TKGU-09-01-03	Terminal Block 6-Position Type
15	TKGU-19-01-03	Terminal Block 4-Position Type
16	TKGU-01-30	Caster (2 Required)
17	TPPU-01-01-10	Shield Cage
18	TKGU-01-65	Strain Relief Bushing Plate
19	TKGU-01-10	Strain Relief Bushing

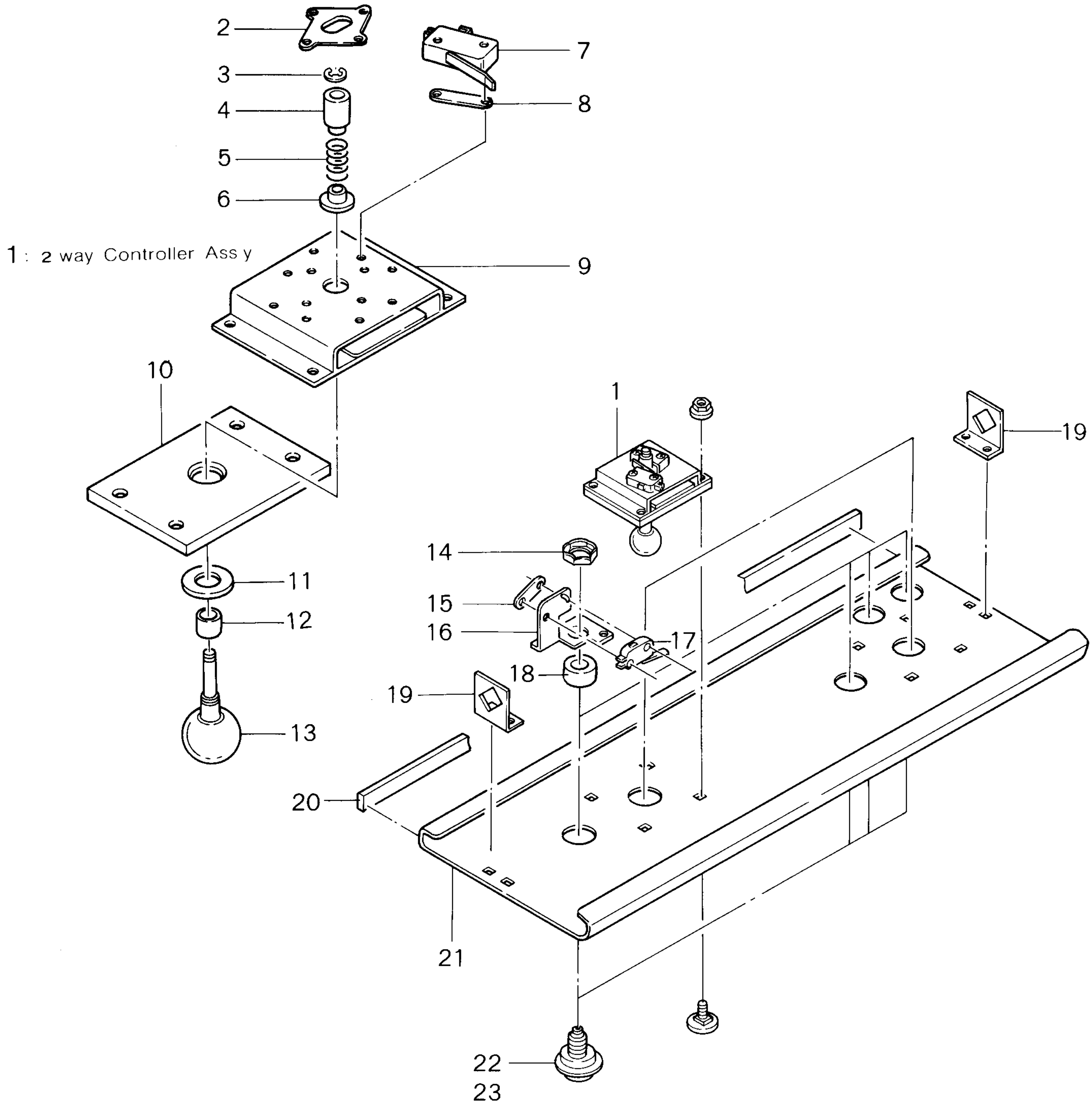


Fig. 15 Operation Panel Assembly

PARTS LIST: TMA1-UP Operation Panel Assembly

ITEM	PART No.	DESCRIPTION
1	TMAU-14-16	Complete 2 way Controller Assy.
2	TMAU-11-17	2 way Guide Plate
3	TKGU-23-23	E Ring 4
4	TKGU-23-21	Switch Collar
5	TKGU-23-22	Lever Spring
6	TKGU-23-20	Spring Stopper
7	TKGU-23-13	Micro-switch VL12L (Bent) (2 Required)
8	TKGU-23-17	Switch Spacer (2 Required)
9	TKGU-23-16	Bearing Bracket
10	TMAU-12-15	Lever Plate
11	TMAU-12-14	Control Knob Plate 28D
12	TMAU-12-16	Controller Knob Collar 8L
13	TMAU-11-18	Knob with Shaft 80.5L
14	TKGU-23-34	Pal Nut (4 Required)
15	TKGU-23-26	Nut Plate (4 Required)
16	TKGU-23-12	Switch Button Bracket (4 Required)
17	TMAU-34-18	Micro-switch VL12L (Straight) (4 Required)
18	TMAU-12-18	Collar 34×28×15H
19	TMAU-11-19	Operation Panel Fastener B 38W
20	TMAU-12-17	Black Sponge 2×10×660L
21	TMAU-12-11	TMA-US Operation Panel
22	TKGU-23-31	Blue Button Assy. (For 1P, 2P)
23	TKGU-23-32	Orange Button Assy. (For Jump)

PARTS LIST: TMA1-UP Wiring Harness

PART No.	DESCRIPTION	See Fig. 16
TMAU-41-16	UP 44P-044 Edge Connecting Harness	
TMAU-41-15	44P 044-FCC PCB Harness	
TPPU-93-02	2P-400 Audio Harness (400mm)	
TPPU-93-07	6P-600 Video Harness (600mm)	
TMAU-41-12	3P-500 Game Counter Harness (500mm)	
TMAU-41-13	4P-800 Service Switch Harness (800mm)	
TMAU-41-14	4P-600 WL Coin Harness (600mm)	
TKGU-13-06	2P Speaker TV Harness [2P-370] (370mm)	
TKGU-13-17	2P Speaker Harness [2P-860] (860mm)	
DJRT-89-08	9P-030 Power Harness (9P-9P Connector)	
DJRT-89-09	12P-030 Power Harness (10P-12P Connector)	
TMAU-41-11	UP 221 Type 15P Operation Panel Harness	
DJRU-13-12	50P Flat Cable [50P-40]	
TPPU-93-11	10P-130 Power Harness (130mm)	

PARTS LIST : TPP2-CPU PCB Assembly

No.	DESCRIPTION (Reference Designations and Locations)	
TMAU-21-01	TMA1-CPU Complete PCB Assembly	
TMAU-21-11	Z80A Microprocessor	(5E)
TMAU-21-12	Z80ADMA DMA Controller	(5D)
TMAU-21-13	3191 (8039) Microprocessor	(5L)
TMAU-21-14	2732 4K byte EPROM 350ns	(6K)
TMAU-21-15	2764 8K byte EPROM 450ns TMA1-C-7D	(7D)
TMAU-21-16	2764 8K byte EPROM 450ns TMA1-C-7E	(7E)
TMAU-21-17	2764 8K byte EPROM 450ns TMA1-C-7F	(7F)
TMAU-21-18	6116 16K byte C-MOS RAM 200ns	(7A, 7B)
TMAU-21-19	LM3900 Audio Amplifier	(3M)
TMAU-21-20	4020B C-MOS Buffer	(3H)
TMAU-21-21	TBP28S42N 512×8bit Bipolar ROM	(4P)
TMAU-21-22	TBP18S030 32×8bit Bipolar ROM	(5B)
TMAU-21-23	74HC374 C-MOS Octal 3 State D-Type Flip Flop	(3K)
TMAU-21-24	74LS00 Quad 2-Input NAND	(4H, 7K)
TMAU-21-25	74LS04 Hex Inverter	(1H, 3E, 4J, 7L)
TMAU-21-26	74LS08 Quad 2-Input AND	(2K)
TMAU-21-27	74LS11 Triple 3-Input AND	(3J)
TMAU-21-28	74LS27 Triple 3-Input NOR	(2B)
TMAU-21-29	74LS32 Quad D Type Flip-Flop	(2A)
TMAU-21-30	74LS74 Dual D Type Flip-Flop	(3D, 4D)
TMAU-21-31	74LS86 Quad 2-Input EXOR	(1K)
TMAU-21-32	74LS123 Dual Re-triggerable Single Shot	(2H, 2D, 4L)
TMAU-21-33	74LS138 3 To 8 Demultiplexer	(3A, 3B, 3C, 4B, 4C)
TMAU-21-34	74LS139 Dual 2 To 4 Line Decoder	(4A)
TMAU-21-35	74LS240 Octal Inverted Buffer	(1L, 1M, 1N)
TMAU-21-36	74LS244 Octal 3 State Bus Buffer	(5H, 6H)
TMAU-21-37	74LS245 Octal Bus Transceiver	(7H)
TMAU-21-38	74LS259 8-bit Addressable Latches	(2L, 7M)
TMAU-21-39	74LS367 Hex Bus Driver	(6A, 6B, 6C)
TMAU-21-40	74LS373 Octal 3-State D-Latches	(6J)
TMAU-21-41	74LS374 Octal 3-State D-Type Flip Flop	(7J)
TMAU-21-42	74LS629 Voltage Control Oscillators	(1J, 2J, 4K)
TMAU-21-43	2SD592 Silicon PNP Transistor	(Q2, Q3)
TMAU-21-44	2SC828 Silicon NPN Transistor	(Q8, Q5, Q6, Q1, Q4)
TMAU-21-45	2SA564 Silicon PNP Transistor	(Q7, Q9)
TMAU-21-46	2SC1815 Silicon NPN Transistor	(Q10)
TMAU-21-47	LS953 Diode	(D2, D5, D6, D8, D7, D9, D10)
TMAU-21-48	WO3B Diode	(D1, D3, D4, D11)
TMAU-21-49	68 Ohm 1/4W ±5% Resistor	(R10, R29, R30, R31)
TMAU-21-50	100 Ohm 1/4W ±5% Resistor	(R55, R57, R53)
TMAU-21-51	150 Ohm 1/4W ±5% Resistor	(R62)

No.	DESCRIPTION (Reference Designations and Locations)	
TMAU-21-52	200 Ohm 1/4W ±5% Resistor	(R11)
TMAU-21-53	220 Ohm 1/4W ±5% Resistor	(R44, R47, R50)
TMAU-21-54	330 Ohm 1/4W ±5% Resistor	(R13, R8, R9, R26, R27, R28)
TMAU-21-55	470 Ohm 1/4W ±5% Resistor	(R46, R48, R51, R54, R56)
TMAU-21-56	510 Ohm 1/4W ±5% Resistor	(R59)
TMAU-21-57	560 Ohm 1/4W ±5% Resistor	(R32, R33)
TMAU-21-58	680 Ohm 1/4W ±5% Resistor	(R4, R58)
TMAU-21-59	1K Ohm 1/4W ±5% Resistor	(R22,R24,R45,R49,R52,R63,R66)
TMAU-21-60	2K Ohm 1/4W ±5% Resistor	(R12)
TMAU-21-61	2.2K Ohm 1/4W ±5% Resistor	(R2)
TMAU-21-62	3.3K Ohm 1/4W ±5% Resistor	(R3)
TMAU-21-63	4.7K Ohm 1/4W ±5% Resistor	(R6, R7)
TMAU-21-64	10K Ohm 1/4W ±5% Resistor	(R1, R23, R25, R60, R65, R67, R68, R69)
TMAU-21-65	12K Ohm 1/4W ±5% Resistor	(R14)
TMAU-21-66	20K Ohm 1/4W ±5% Resistor	(R64, R17, R18)
TMAU-21-67	22K Ohm 1/4W ±5% Resistor	(R19, R20, R40)
TMAU-21-68	33K Ohm 1/4W ±5% Resistor	(R16, R15)
TMAU-21-69	43K Ohm 1/4W ±5% Resistor	(R42)
TMAU-21-70	47K Ohm 1/4W ±5% Resistor	(R61)
TMAU-21-71	100K Ohm 1/4W ±5% Resistor	(R43, R5, R41)
TMAU-21-72	360K Ohm 1/4W ±5% Resistor	(R38)
TMAU-21-73	750K Ohm 1/4W ±5% Resistor	(R37,R39)
TMAU-21-74	1M Ohm 1/4W ±5% Resistor	(R35)
TMAU-21-75	1.8M Ohm 1/4W ±5% Resistor	(R36, R21)
TMAU-21-76	2M Ohm 1/4W ±5% Resistor	(R34)
TMAU-21-77	Octal 1K Ohm Series Resistor Array	(RM3, RM6)
TMAU-21-78	Octal 4.7K Ohm Series Resistor Array	(RM7)
TMAU-21-79	Hex 68 Ohm Series Registor Array	(RM1, RM2, RM4, RM5)
TMAU-21-80	Rader Matrix 10K Ohm×20K Ohm	(MXR1)
TMAU-21-81	30PF 50V Ceramic-Disc Capacitor	(C45, C46)
TMAU-21-82	0.01μF 50V Ceramic-Disc Capacitor	(C7, C8, C12, C60～C91)
TMAU-21-83	100P 50V Styrol Capacitor	(C18, C30)
TMAU-21-84	0.0039μF 50V Film Capacitor	(C6)
TMAU-21-85	0.0047μF 50V Film Capacitor	(C39)
TMAU-21-86	0.0068μF 50V Film Capacitor	(C16)
TMAU-21-87	0.022μF 50V Film Capacitor	(C17, C40, C31)
TMAU-21-88	0.039μF 50V Film Capacitor	(C5)
TMAU-21-89	0.1μF 50V Film Capacitor	(C28)
TMAU-21-90	1μF 50V Al. Electrolytic Radial Capacitor	(C32, C29)
TMAU-21-91	3.3μF 50V Al. Electrolytic Radial Capacitor	(C43, C44)
TMAU-21-92	10μF 50V Al. Electrolytic Radial Capacitor	(C9, C10, C19～C27) (C33～C37)

No.	DESCRIPTION (Reference Designations and Locations)	
TMAU-21-93	47μF 16V Al. Electrolytic Axial Capacitor	(C13)
TMAU-21-94	100μF 16V Al. Electrolytic Axial Capacitor	(C11, C38)
TMAU-21-95	470μF 16V Al. Electrolytic Axial Capacitor	(C2, C54～C56)
TMAU-21-96	1μF 10V Tantalum Radial Capacitor	(C50)
TMAU-21-97	4.7μF 10V Tantalum Radial Capacitor	(C4, C14, C15, C41)
TMAU-21-98	10μF 10V Tantalum Radial Capacitor	(C1, C3)
TMAU-21-99	8.00MHz Crystal	(X1)
TMAU-21-100	11.00MHz Crystal	(X2)
TMAU-21-101	NC5892-01 MINI BUS BAR	
TMAU-21-102	NC2158-07 MINI BUS BAR	
TMAU-21-103	16Pin Dip IC Socket	(5B)
TMAU-21-104	20Pin Dip IC Socket	(4P)
TMAU-21-105	24Pin Dip IC Socket	(6K)
TMAU-21-106	28Pin Dip IC Socket	(7D, 7E, 7F)
TMAU-21-107	40Pin Dip IC Socket	(5E, 5L)
TMAU-21-108	8-Station Single-Throw DIP Bit Switch	(SW1)
TMAU-21-109	50Pin Flat Cable Header	(P1)
TMAU-21-110	10Pin Connector Receptacle	(P2)
TMAU-21-111	Battery Case TYPE32-4 UM3×2)	
TMAU-21-112	Philips Head Machine Screw (With Spring Washer M2.6×8)	
TMAU-21-113	Flat Washer M2.6	
TMAU-21-114	Nut Plate M2.6	
	Beaded Wire Tie	
TMAU-21-115	T314 Ferrite Beads	(FC1～FC9)
TMAU-21-116	Dry Battery UM-3	

PARTS LIST : TMA1-VIDEO PCB Assembly

No.	DESCRIPTION (Reference Designations and Locations)	
TMAU-22-01	TMA1-VIDEO Complete PCB Assembly	
TMAU-22-11	2732 4K byte EPROM 250ns TMA-C-3F	(3F)
TMAU-22-12	2732 4K byte EPROM 250ns TMA-C-3J	(3J)
TMAU-22-13	2732 4K byte EPROM 250ns TMA-C-7M	(7M)
TMAU-22-14	2732 4K byte EPROM 250ns TMA-C-7N	(7N)
TMAU-22-15	2732 4K byte EPROM 250ns TMA-C-7P	(7P)
TMAU-22-16	2732 4K byte EPROM 250ns TMA-C-7S	(7S)
TMAU-22-17	2732 4K byte EPROM 250ns TMA-C-7T	(7T)
TMAU-22-18	2732 4K byte EPROM 250ns TMA-C-7U	(7U)

No.	DESCRIPTION (Reference Designations)	
TMAU-22-19	2114 1K×4 bit RAM 200ns	(3D, 3E)
TMAU-22-20	2148 1K×4 bit RAM 55ns	(8B, 8C)
TMAU-22-21	93419 64×9 bit Bipolar RAM 70ns	(8E)
TMAU-22-22	7074 256×4 bit ECL RAM 10ns	(3P, 3R)
TMAU-22-23	10124 Quadruple TTL-TO-ECL Translators	(4P, 4R, 5P, 5R)
TMAU-22-24	10125 Quadruple ECL-TO-TTL Translators	(3S, 3T)
TMAU-22-25	74S04 Shottky Hex Inverter	(2U)
TMAU-22-26	74S32 Shottky Quad 2-Input OR	(3U)
TMAU-22-27	74S74 Shottky Dual D-Type Flip-Flop	(2T)
TMAU-21-24	74LS00 Quad 2-Input NAND	(2M, 5H)
TMAU-22-28	74LS02 Quad 2-Input NOR	(1K, 5E, 5U)
TMAU-21-25	74LS04 Hex Inverter	(1R, 4E)
TMAU-21-26	74LS08 Quad 2-Input AND	(8A)
TMAU-22-29	74LS10 Triple 3-Input NAND	(5L)
TMAU-22-30	74LS20 Dual 4-Input NAND	(4H, 5F, 6P)
TMAU-21-28	74LS27 Triple 3-Input NOR	(6S)
TMAU-22-31	74LS30 8-Input NAND	(4J)
TMAU-21-29	74LS32 Quad D-Type Flip-Flop	(4L)
TMAU-21-30	74LS74 Dual D-Type Flip-Flop	(1L, 1M, 4F)
TMAU-21-31	74LS86 Quad 2-Input EXOR	(1B, 1D, 2D, 3A, 3B, 3C) (4N, 5N, 6H, 6N, 7H)
TMAU-22-32	74LS109 Dual J-K Flip-Flop	(3M)
TMAU-21-32	74LS123 Dual Retriggerable Single Shot	(1F, 1H)
TMAU-21-34	74LS139 Dual 2-TO-4 Line Decocler	(4K)
TMAU-22-33	74LS157 Quad 2-To-1 Line Data Selector	(2K, 4B, 4C, 4D, 4S, 4U, 5, 5S5T, 6C, 6D, 7B, 8M, 8N)
TMAU-22-34	74LS161 Synchronous 4 bit Counter	(1C, 1S, 1T, 2S, 5J, 5K, 5C, 5D, 1A)
TMAU-22-35	74LS163 Synchronous Presettable 4 bit Counter With Clear	(4M, 5M)
TMAU-22-36	74LS174 Hex D-Type Flip-Flop	(6T, 6U)
TMAU-22-37	74LS175 Quad D-Type Flip-Flop	(3K, 6J, 7J)
TMAU-21-35	74LS240 Octal Inverted Buffer	(8H)
TMAU-21-37	74LS245 Octal Bus Transceiver	(2F, 7C)
TMAU-22-38	74LS273 Octal D-Type Flip-Flop	(6M, 7D, 8D, 8JJ)
TMAU-22-39	74LS283 4 bit Full Adder	(6E, 6F, 6K, 6L, 7E, 7F, 7K, 7L)
TMAU-22-40	74LS299 8 bit Shift Registor	(2H, 2J, 8N, 8P, 8R, 8S, 8T, 8U)
TMAU-21-39	74LS367 Hex Bus Driver	(1P, 2P)
TMAU-21-40	74LS373 Octal 3-State D-Latches	(4T, 8K)
TMAU-22-41	74LS377 Octal D-Type Flip-Flop	(1E, 6R)
TMAU-22-42	0 Ohm 1/4W ±5% Registor	(R10)
TMAU-21-50	100 Ohm 1/4W ±5% Registor	(R5)
TMAU-22-43	390 Ohm 1/4W±5% Registor	(R7)
TMAU-21-56	510 Ohm 1/4W ±5% Registor	(R6, R14)
TMAU-21-59	1K Ohm 1/4W ±5% Registor	(R13, R11)
TMAU-21-61	2.2K Ohm 1/4W ±5% Registor	(R8, R9)
TMAU-21-63	4.7K Ohm 1/4W ±5% Registor	(R2, R4)

No.	DESCRIPTION (Reference Designations and Locations)	
TMAU-21-67	22K Ohm 1/4W ±5% Resistor	(R1)
TMAU-22-44	27K Ohm 1/4W ±5% Resistor	(R3)
TMAU-21-77	Octal 1K Ohm Series Resistor Array	(RM4)
TMAU-22-45	Octal 510 Ohm Series Resistor Array	(RM1,RM2,RM3,RM5)
TMAU-22-46	51PF 50V Ceramic-Disc Capacitor	(C5, C8)
TMAU-22-47	68PF 50V Ceramic-Disc Capacitor	(C19, C11)
TMAU-22-48	150PF 50V Ceramic-Disc Capacitor	(C10)
TMAU-22-49	220PF 50V Ceramic-Disc Capacitor	(C15, C1)
TMAU-22-50	330PF 50V Ceramic-Disc Capacitor	(C9)
TMAU-21-82	0.01μF 50V Ceramic-Disc Capacitor	(C20～C51)
TMAU-22-51	1000PF 50V Styrol Capacitor	(C2)
TMAU-21-87	0.022μF 50V Film Capacitor	(C4)
TMAU-21-89	0.1μF 50V Film Capacitor	(C3)
TMAU-21-95	470μF 16V Al. Electrolytic Axial Capacitor	(C7, C13, C16)
TMAU-22-52	24.00MHz Crystal	(X1)
TMAU-22-53	NC5854-00 MINI BUS BAR	
TMAU-22-54	NC5870-03 MINI BUS BAR	
TMAU-22-55	NC5872-08 MINI BUS BAR	
TMAU-21-105	24Pin DIP IC Socket	(3F, 3J, 7M, 7N, 7P, 7S, 7T, 7U)
TMAU-21-109	50Pin Flat Cable Header	(P1)
TMAU-21-110	10Pin Connector Receptacte	(P2)
TMAU-22-56	30K Ohm VR	(VR1, VR2)
TMAU-22-57	GP-7 Ferrite Beads	(FC1～FC16)

PARTS LIST : TMA1-FCC PCB Assembly

No.	DESCRIPTION (Reference Designations and Locations)
TMAU-23-01	TMA1-FCC Complete PCB Assembly
TMAU-23-11	26Pin Straight Connector
TMAU-23-12	0.1μF 12V Ceramic Disc-Capacitor
TMAU-21-82	0.01μF 50V Ceramic Disc-Capacitor
TMAU-23-13	0.001μF 50V Ceramic Disc-Capacitor
TMAU-22-57	GP-7 Ferrite Beads

PARTS LIST : PP-7B Power Supply Assembly

No.	DESCRIPTION (Reference Designations and Locations)	
DJR-18-01	(PP7B) Power P.C. Board Complete Set	
DJR-18-02	2SC2555 Silicon NPN Transistor	(TR1)
DJR-18-03	2SA817 Silicon PNP Transistor	(TR2, TR4)
DJR-18-04	2SC2535 Silicon NPN Transistor	(TR3)
DJR-18-05	2SA1015 Silicon PNP Transistor	(TR5)
DJR-18-06	CTV-2S Fast Recovery Center Tap Diode	(D4)
DJR-18-07	CTB33S Schottky Diode	(D5, D9)

No.	DESCRIPTION (Reference Designations and Locations)	
DJR-18-08	S4VB40 4A/400VW Silicon Rectifier Diode	(BR)
DJR-18-09	1B4B41 Silicon Rectifier Diode	(BR2)
DJR-18-10	3D-1001 Hybrid IC	(IC1, IC2)
DJR-18-11	7824 3 Terminal Regulator	(IC3)
DJR-18-12	7812 3 Terminal Regulator	(IC4)
DJR-18-13	5P4M Thyristors	(SCR)
DJR-18-14	03P05M Thyristors	(SCR2)
DJR-18-15	1S954 Diode	(D1, D6, D10, D11)
DJR-18-16	10DF-4 Diode	(D2, D3, D7, D8)
DJR-18-17	PC614 Photo Coupler	(IC5)
DJR-18-18	05Z 5.6V Zener Diode	(ZD1)
DJR-18-19	05Z 5.1L Zener Diode	(ZD2)
DJR-18-20	05Z5.6Z Zener Diode	(05Z)
DJR-18-21	470P/2KV DE070B471K2K Ceramic Capacitor	(C1, C2, C9)
DJR-18-22	0.1μF/50V Ceramic Capacitor	(C29)
DJR-18-23	0.047μF/630VW Film Capacitor MDD2J473M	(C3, C4, C5)
DJR-18-24	0.01μF/50V Film Capacitor	(C8, C17)
DJR-18-25	1000PF/50V FilmCapacitor	(C14, C26)
DJR-18-26	1000μF/50V Al. Electrolytic Capacitor	(C10)
DJR-18-27	47μF/35V Al. Electrolytic Capacitor	(C11, C13)
DJR-18-28	47μF/16V Al. Electrolytic Capacitor	(C12, C18, C19, C20, C30, C31, C32, C36, C37, C38)
DJR-18-29	3300μF/10V Al. Electrolytic Capacitor	(C27, C28, C15, C16)
DJR-18-30	100μF/25V Al. Electrolytic Capacitor	(C23, C33)
DJR-18-31	10μF/16V Al. Electrolytic Capacitor	(C22, C24, C25, C34, C35)
DJR-18-32	330μF/200V Al. Electrolytic Capacitor	(C6, C7)
DJR-18-33	1000μF/25V Al. Electrolytic Capacitor	(C21)
DJR-18-34	20 Ohm 2W Resistor (Coil Winding)	(R1)
DJR-18-35	1K Ohm 1/4W ±5% Resistor	(R2, R12, R14, R15, R18, R22)
DJR-18-36	51 Ohm 1/4W±5% ±5% Resistor	(R3, R4, R11, R15, R17, R19, R21, R23)
DJR-18-37	12 Ohm 1/2W ±5% Resistor	(R5, R8, R20, R24, R6, R26)
DJR-18-38	470 Ohm 1/4W ±5% Resistor	(R10)
DJR-18-39	22 Ohm 1/2W±5% Resistor	(R13)
DJR-18-40	20K Ohm 1/2W ±5% Resistor	(R16, R25)
DJR-18-41	100 Ohm 1/2W ±5% Resistor	(R27)
DJR-18-42	20 Ohm 5W Resistor	(R9)
DJR-18-43	510 Ohm 3W Resistor (Metal Oxide)	(R7)
DJR-18-44	50K Ohm GF06P Variable Resistor	(VR2, VR4)
DJR-18-45	2K Ohm GF06P Variable Resistor	(VR1, VR3)
DJR-18-46	5m Ohm Shunt Resistor	(SH1, SH2)
DJR-18-47	SC-02 SC Coil	(L1)
DJR-18-48	100mH 5A SF Coil	(L4, L5)
DJR-18-49	800mH 2A SF Coil	(L2, L3)
DJR-18-50	3D-0097 EC-35 Type Oscillator Trans	(T1)
DJR-18-51	3D-0097 EI-35 Type Oscillator Trans	(T2)
DJR-18-52	3D-1000 EE-16 Type Oscillator Trans	(T3, T4)
DJR-18-53	4A-125V Fuse FGMB4A-125V NR Type	(F)